AMENDMENTS TO THE CLAIMS

Claims 1-22 (Canceled).

23. (Original) A method of detecting explosives and controlled substances in an object, comprising:

transporting the object through a cavity in a shielded apparatus, said cavity comprising one or more turns which preclude a straight line trajectory through the cavity;

generating low intensity neutron particles from a plurality of neutron sources;

irradiating the object with the neutron particles wherein the object generates prompt gamma rays;

detecting the prompt gamma rays with a plurality of gamma ray detectors;

analyzing the gamma counts associated with the explosives or controlled substances in the object; and

determining whether an explosive or controlled substance is present in the object when the relative atomic percentages of elements comprising the controlled substances are substantially similar to the relative atomic percentages of elements associated with known explosives and controlled substances.

24. (Currently amended) A method of detecting explosives and controlled substances in an object, comprising:

detecting the back scattered gamma rays emitted by all substances contained within the object in response to the irradiation;

determining the gamma counts with a plurality of gamma ray detectors;

isolating the common eigen value signatures of the substances contained within the object; and

using a maximal rejection hierarchy classifier to determine if an explosive or controlled substance is present in the object without interference by the presence of a confounding substance.

25. (Original) The method of claim 23, wherein the cavity is surrounded by water.

26. (Original) The method of claim 23, wherein the low energy neutron particles comprise 14.7 MeV neutrons with an energy density of 10^7 neutrons/sec.

27. (Original) The method of claim 23, wherein the neutron particles are generated by pulsing the neutron sources simultaneously.

28. (Original) The method of claim 27, wherein the neutron sources are pulsed sequentially after the presence of an

explosive or controlled substance is detected with a scan of simultaneously pulsed neutron sources.

29. (Original) The method of claim 23, wherein the object is irradiated a first time and at least a second time.

30. (Original) The method of claim 29, wherein the neutron particles are generated by pulsing the neutron sources simultaneously at the first time.

31. (Original) The method of claim 30, wherein the neutron particles are generated by pulsing the neutron sources sequentially at the at least a second time.

32. (Original) The method of claim 23, wherein the plurality of neutron sources comprises at least 10 neutron sources.

33. (Original) The method of claim 23, wherein the plurality of neutron sources are low intensity neutron sources.

34. (Original) The method of claim 23, wherein the plurality of gamma ray detectors comprises at least 100 gamma ray detectors.

35. (Original) The method of claim 23, wherein the neutron sources are arranged in an array in close proximity to the object.

36. (Original) The method of claim 35, wherein the array is arranged such that an equal number of neutron sources are disposed on at least two sides of the array.

37. (Original) The method claim 36, wherein each neutron source irradiates a predetermined area of the object.

38. (Original) The method claim 35, wherein the array further comprises the plurality of gamma ray detectors.

39. (Canceled).

40. (Currently amended) The method of claim 38 ~~39~~, wherein the array is arranged such that an equal number of gamma ray detectors are disposed on at least two sides of the array.

41. (Original) The method of claim 35, wherein the cavity further comprises a transport mechanism for moving the object through the cavity.

42. (Original) The method claim 41, wherein the array is disposed inside the cavity and the object passes through the array as the transport mechanism moves the object through the cavity.

43. (Currently amended) The method of claim 23, wherein the elements comprising the explosives and controlled substances are selected from the group consisting of carbon, oxygen, nitrogen, and chlorine.

44. (Currently amended) The method of claim 23, wherein the explosives and controlled substances are selected from the group including TNT, PETN, RDX, HMX, Ammonium Nitrate, Plutonium, Uranium, and drugs.

45. (Original) The method of claim 44, wherein the energies of gamma counts associated with carbon, oxygen, nitrogen, and chlorine are 4.43 MeV, 6.14 MeV, 2.31 MeV, respectively.

46. (Original) The method of claim 23, further comprising determining whether a confounder is present in the object when the relative atomic percentages of elements comprising the controlled substances are substantially similar to the relative atomic percentages of elements associated with known confounders.

47. (Original) The method of claim 46, wherein the confounders are selected from group consisting of nylon and food.